

# **Smoke-Free Pregnancies Collaborating Organizations**

**Centers for Disease Control & Prevention**

**Robert Wood Johnson Foundation's  
Smoke-Free Families Program**

**American College of Obstetricians &  
Gynecologists**

**Agency for Health Care Policy and Research**

**Health Resources and Services Administration**

**Smoke-Free Families**

# **Dangers of Smoking Before, During and After Pregnancy**

# What's in a Cigarette?

## ***Blended tobacco plus:***

- Artificial milk chocolate
- Artificial tobacco flavor
- Licorice flavor
- Fructose syrup
- Molasses
- Sucrose
- Vanilla
- Casing
- Cedarwood oil
- Ethanol
- Invert sugar
- Isovaleric acid
- Glycerol
- Hexanoic acid
- Methanol
- Olibanum oil
- Patchouli oil
- Phenylacetic acid
- Propylene glycol
- Valerian root
- Vanillin
- Vetiver oil
- 3-methylpentanoic acid

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# **Smoking before Pregnancy**

- **Decreased ovulation**
- **Impaired tubal transport**
- **Reduced sperm count and motility**
- **The greater the number of cigarettes smoked, the greater the effect on fertility**

# **Smoking during Pregnancy**

## ***Adverse Outcomes***

- **Preterm birth**
- **Growth retardation**
- **Low birthweight**
- **Sudden Infant Death Syndrome (SIDS)**
- **Childhood illness**
- **School problems**

# **Smoking during Pregnancy**

## ***Pregnancy Outcomes***

<b><i>Outcome</i></b>	<b><i>Effect</i></b>
<b>Mean Gestational Age</b>	<b>Little or None</b>
<b>Preterm Birth</b>	<b>RR = 1.4</b>
<b>Growth Retardation</b>	<b>RR = 2.4</b>
<b>Mean Birth weight</b>	<b>- 149 grams</b>

**A small proportion of preterm births, but 36% of all growth retardation is attributable to smoking.**

Kramer, 1987

# **Smoking during Pregnancy**

## ***Risk Factors***

**In the developed world, cigarette smoking is the most powerful known determinant of fetal growth retardation. The relationship between smoking and low birthweight is one of the most consistent findings in the epidemiologic literature.**

Stein & Susser

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# **Smoking during Pregnancy**

## ***Reasons for Reduced Fetal Growth***

- **Lower maternal weight gain**
- **Vasoconstriction and decreased uterine blood flow**
- **Carbon monoxide toxicity**
- **Increased cyanide production**



# Smoking during Pregnancy

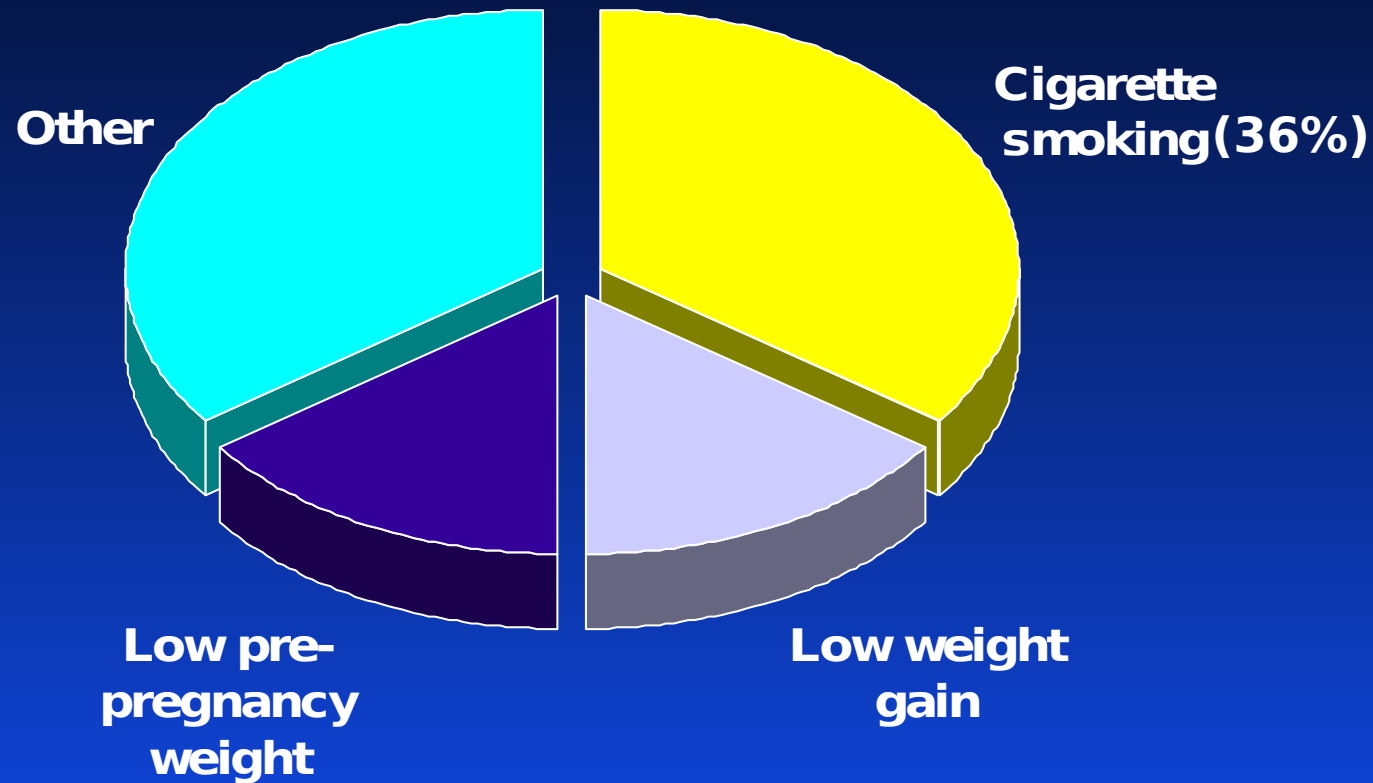
## *Passive Exposure*

**Maternal exposure to passive smoking in early pregnancy more than doubles the risk of delivering a small-for-gestational-age infant.**

Dejin-Karlsson  
*AJPH*, 1998

# **Smoking during Pregnancy**

## ***Growth Retardation in Developed Countries-- Risk Factors***

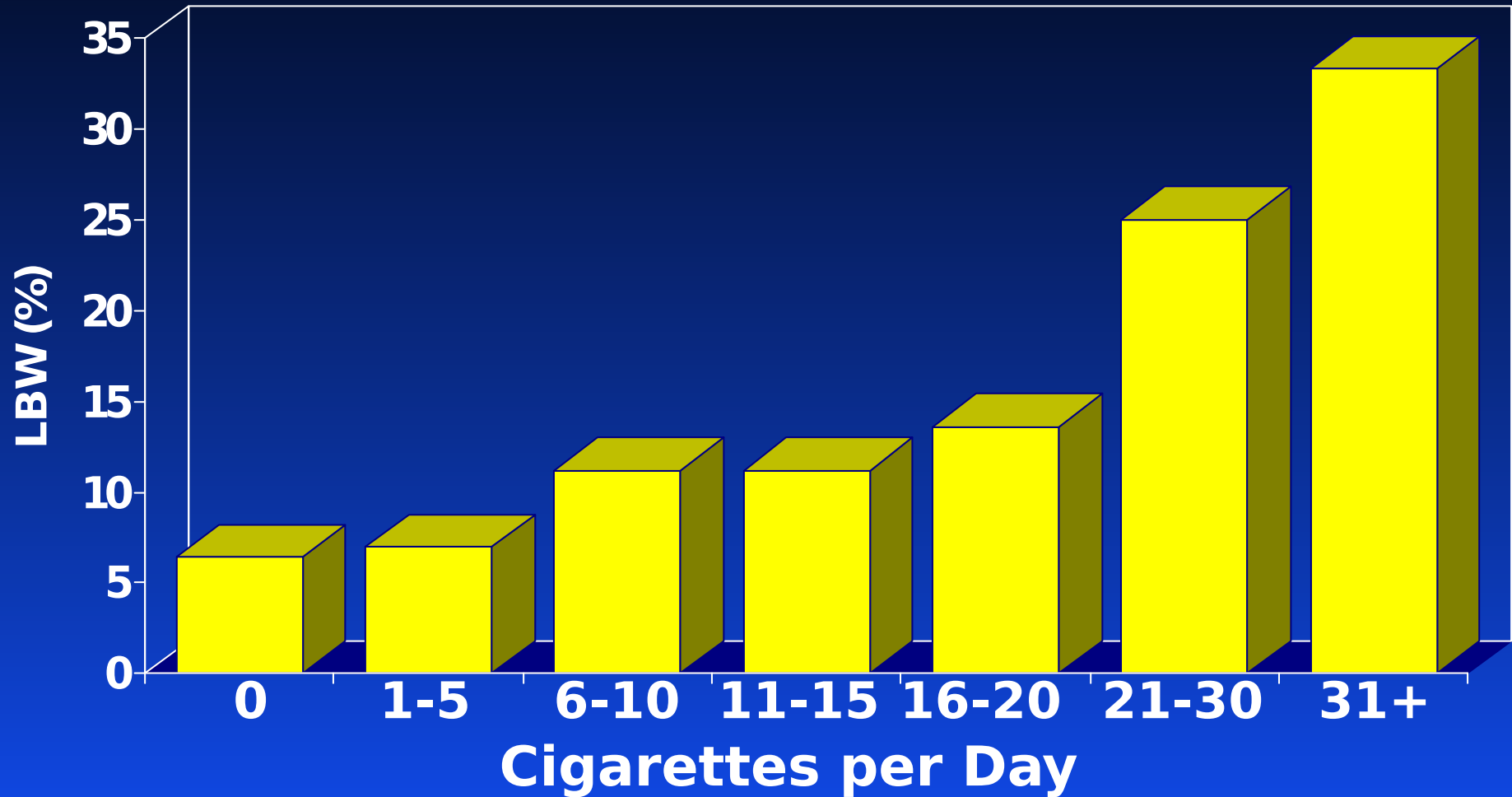


**Kramer, *WHO Bulletin*,  
1987**

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# Smoking during Pregnancy

## *Low Birthweight*



Simpson, *Am J OBGYN*, 1957

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# **Smoking during Pregnancy *SIDS***

- **Maternal smoking during pregnancy has been associated with a 2-4 fold increased risk of SIDS**
- **Maternal postpartum smoking and smoking by others in the household has also been associated with SIDS**

# **Smoking after Pregnancy**

**Children of smokers are more likely to experience:**

- Sudden Infant Death Syndrome (SIDS)**
- Respiratory infection including bronchitis and pneumonia**
- Otitis media**
- Asthma**
- Hospitalization**

# **Smoking during Pregnancy**

## ***Long-Term Effects on Children***

- **Decreased IQ**
  - **Lower scores on spelling and reading tests**
- **Poorer school performance**
  - **Shorter attention span**
  - **More likely to be hyperactive**
- **Decreased height**

# Smoking during Pregnancy

## *Long-Term Effects on Children*

Children of mothers who quit smoking during pregnancy scored 5 points higher on IQ tests and had better motor skills compared to those whose mothers did not quit.

Sexton, 1990

# **Which Women Smoke?**



# **Risk Factors For Smoking**

- **Low Education**
- **Young Age**
- **White Race**
- **Medicaid Recipient**
- **Partner Who Smokes**

# **Smoking during Pregnancy *By Education***

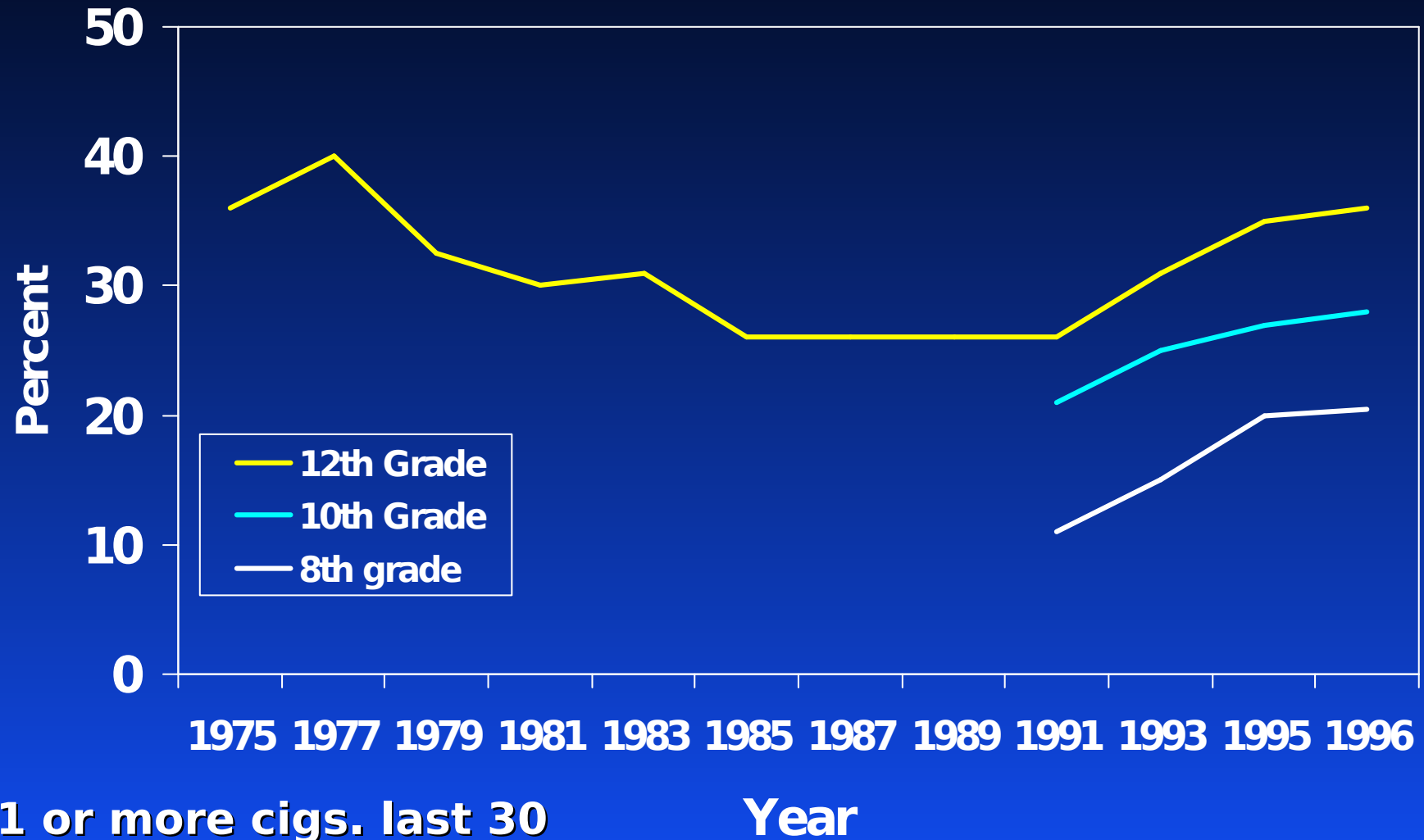
**Less than High School 26%**

**High School Graduate 18%**

**Some College 11%**

**College Graduate 3%**

# Smoking in Grade School *USA 1975-1996*

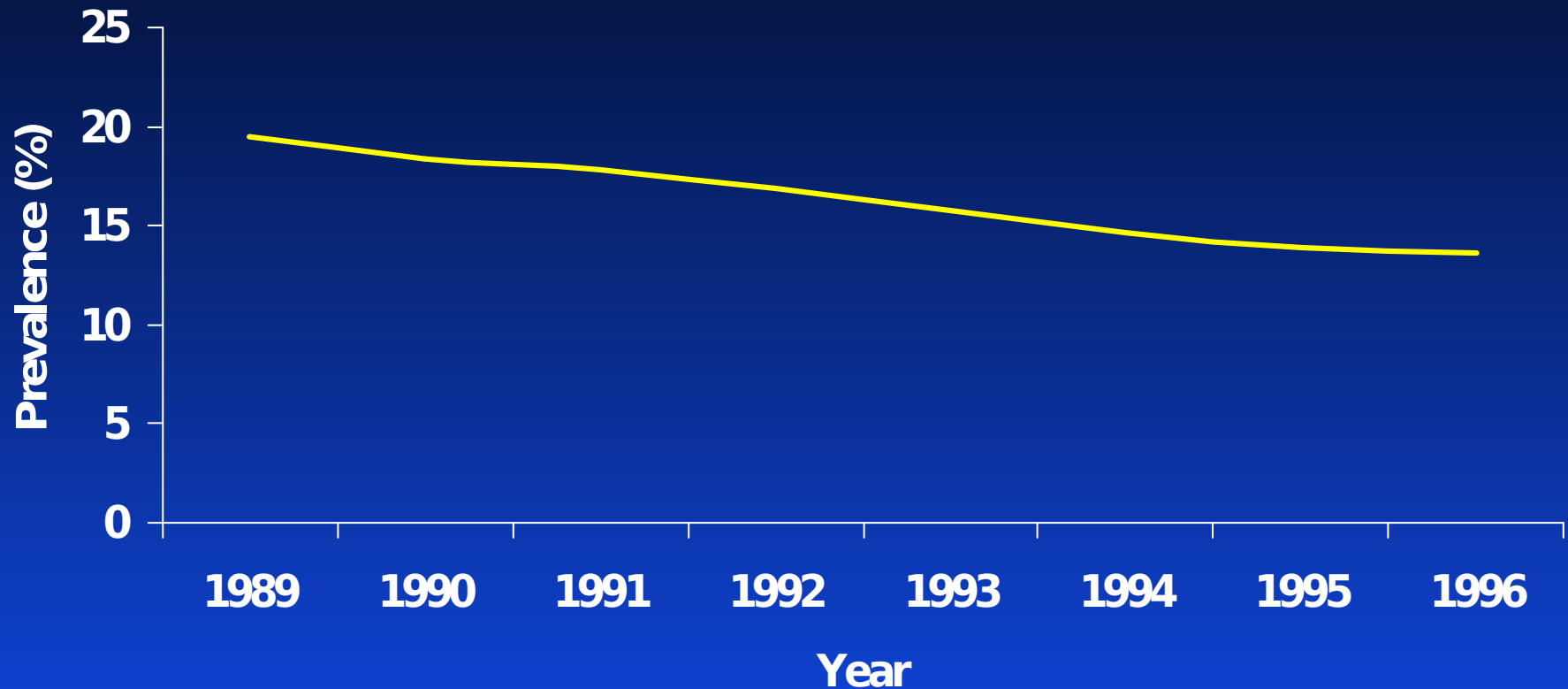


1 or more cigs. last 30  
days

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# Smoking Among Pregnant Women

## United States, 1965-1996



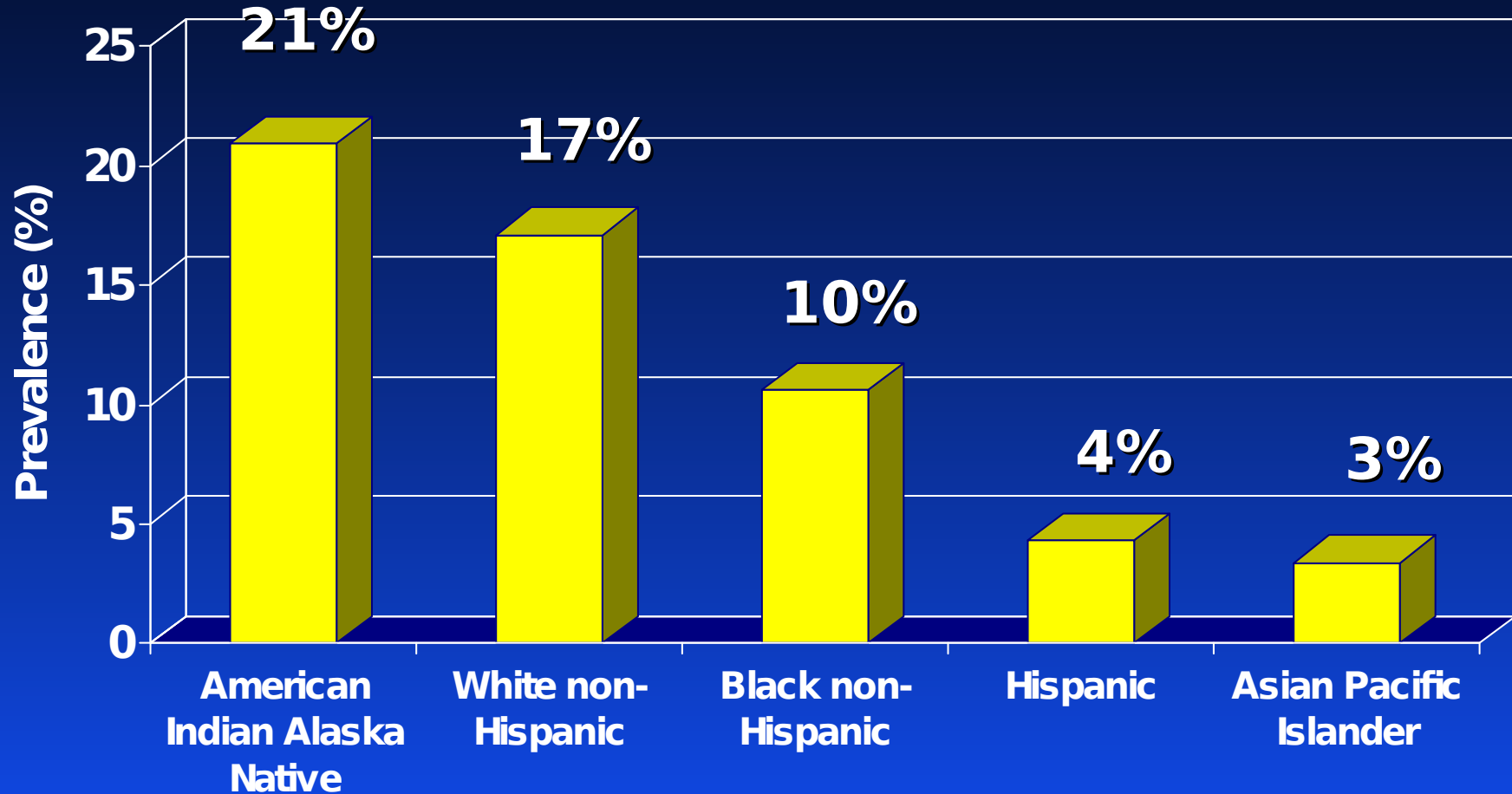
*Final Natality Statistics, 1989-1996*

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# Smoking during Pregnancy

## *By Race and Ethnicity*

### *United States, 1996*



*Final Natality Statistics,  
1996*

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# **Who Smokes before Pregnancy**

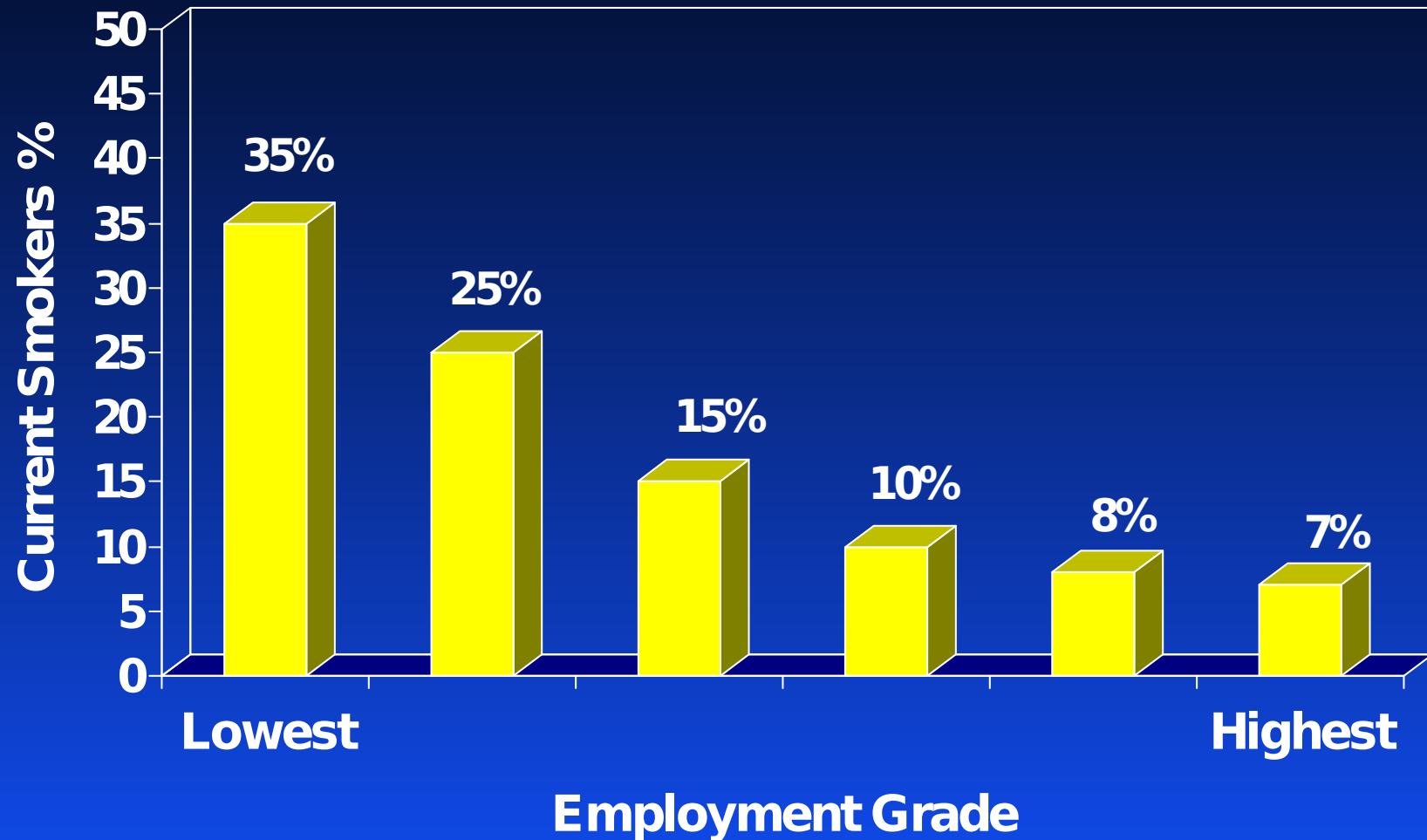
## ***By Source of Care and Payment***

<b>Source</b>	<b>Percent</b>
<b><u>Health Department</u></b>	<b>60%</b>
<b>Medicaid (Any Source)</b>	<b>60%</b>
<b>Private MD and Insurance</b>	<b>30%</b>

Adams from *PRAMS*

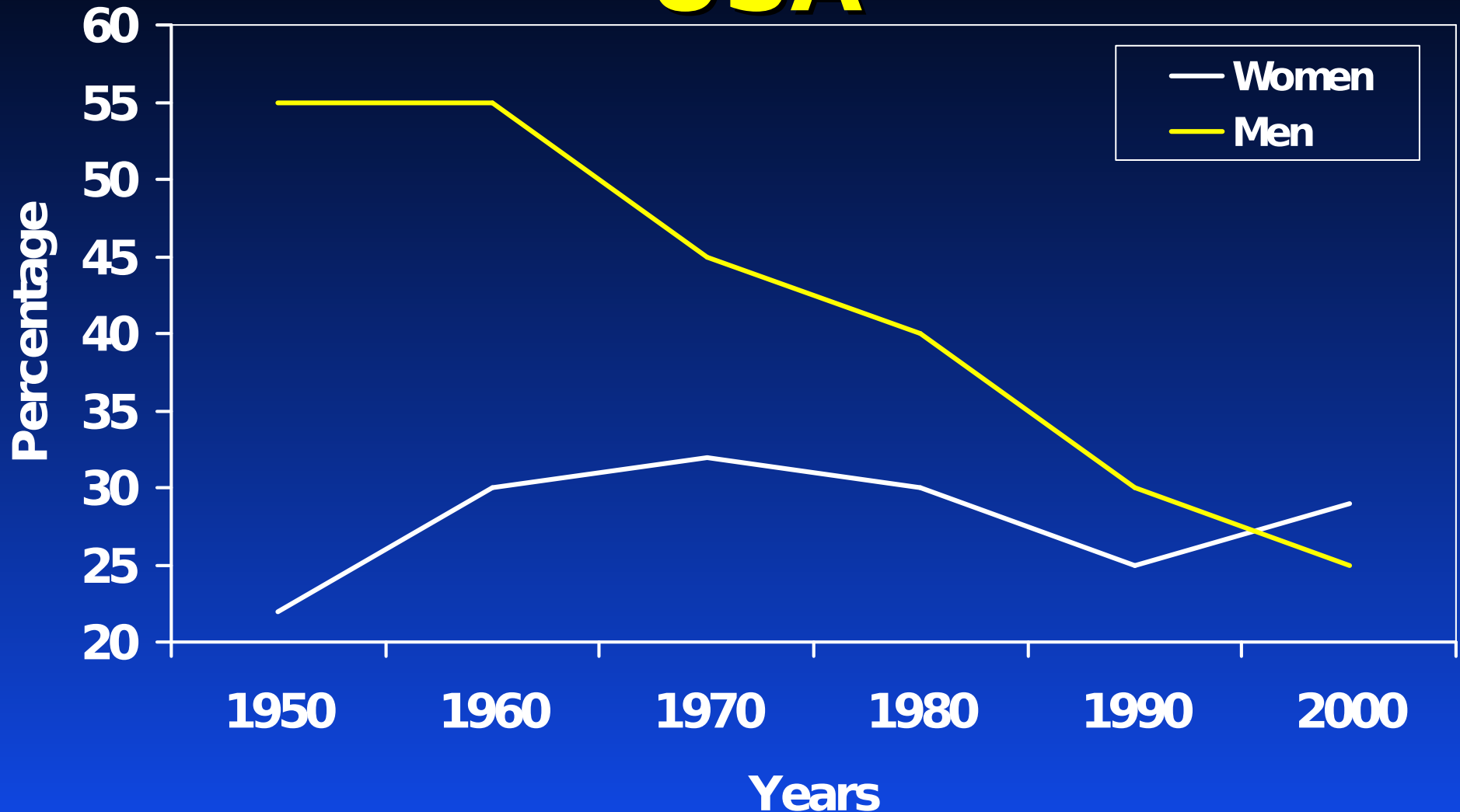
# Smoking during Pregnancy

## *By Employment Status*



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# Smoking Prevalence in the USA



*JAMA, 1989:261*

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# **Smoking Among Women**

**In 1994, more than 14 million U.S. women aged 15-45 years were smokers.**

**800,000 to 1,000,000 of these women become pregnant each year.**

# **Smoking during Pregnancy**

## ***Long-Term Effects on Woman***

***Increased***

***Decreased***

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**Cancer  
expectancy**

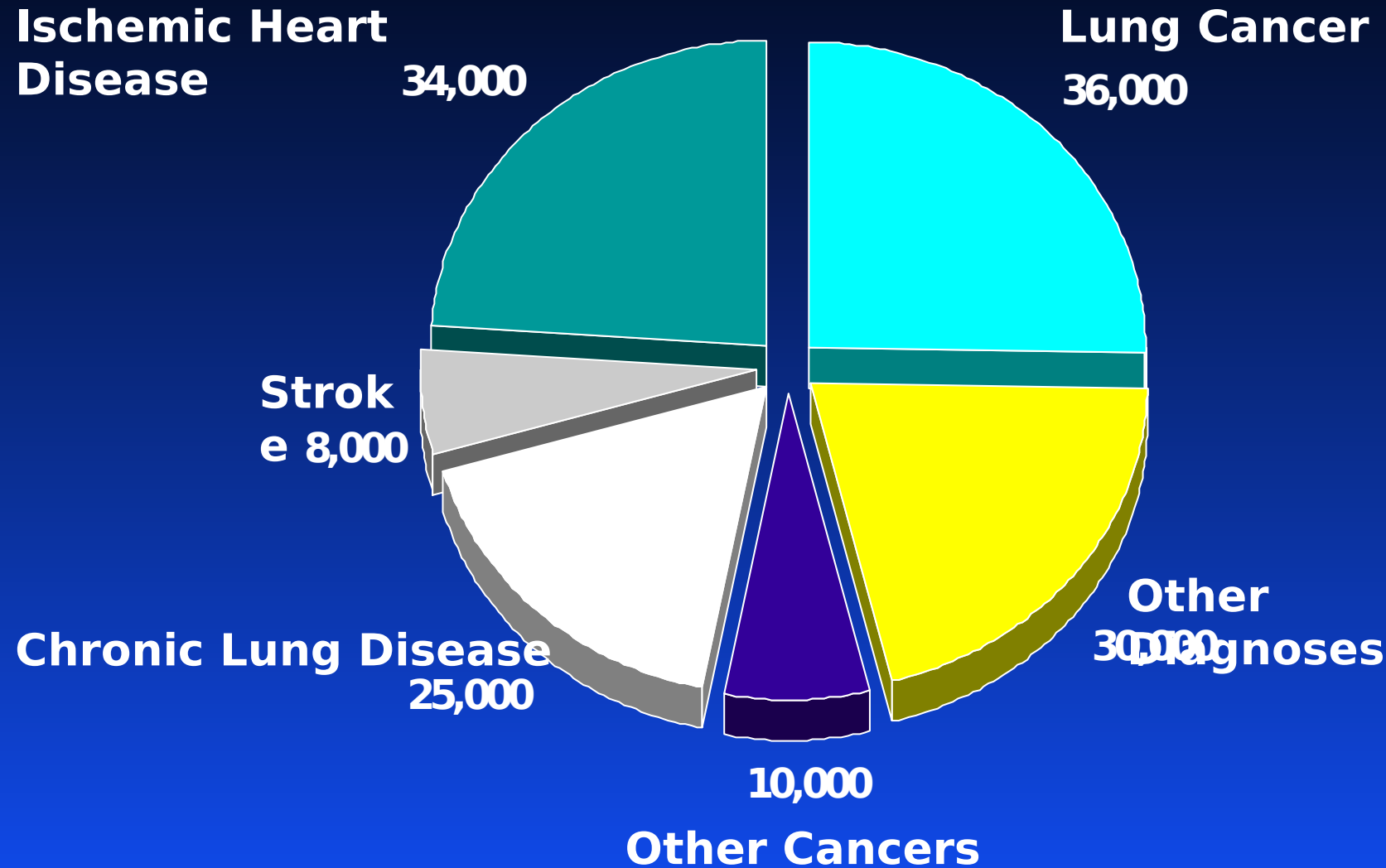
**Life**

**Heart Disease**

**Chronic Lung Disease**

**Stroke**

# 142,000 Deaths Attributable to Cigarette Smoking in Women - United States, 1990



CDC, MMWR, 8-27-93

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# Diagnosis of Smoking

# Diagnosis of Smoking

**Deception rates, as confirmed by comparing results of biochemical tests with self-reports, are high. They may reach 50% in some populations.**

Alabama SCIP, 1998

# Diagnosis of Smoking

- **Biologic markers are the gold standard for diagnosing smoking or documenting cessation.**
- **A structured questionnaire correlates better with biologic markers than does asking a pregnant woman if she smokes and how much.**

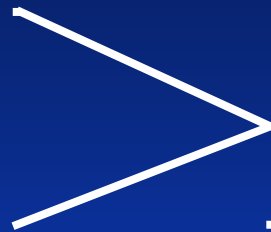
# Diagnosis of Smoking

***Biological Markers:***

**Thiocyanate**

**Cotinine**

**Carbon Monoxide**



***Measured***

***in:***

**Urine**

**or**

**Saliva**

**Expired  
air**

# **Recommended Multiple-Choice Question**

**Which of the following statements best describes your cigarette smoking? Would you say:**

- 1. I smoke regularly now -- about the same amount as before finding out I was pregnant.**
- 2. I smoke regularly now, but I've cut down since I found out I was pregnant.**
- 3. I smoke every once in a while.**
- 4. I have quit smoking since finding out I was pregnant.**
- 5. I wasn't smoking around the time I found out I was pregnant, and I don't currently smoke cigarettes.**

Mullen et al., 1991



# Cessation and Treatment Programs

# Spontaneous Cessation

- **Between 10 and 40% of pregnant smokers quit spontaneously.**
- **The percentage depends on the mother's age, race, education, duration and level of smoking.**

# **Self-Initiated Rates of Cessation among Pregnant Women**

- **40% of pregnant women who are privately insured quit smoking before their first prenatal visit**
- **20% of pregnant women who are covered by Medicaid quit smoking before their first prenatal visit**

**Windsor, Li, Lowe, et al., 1993  
Ershoff, Mullen, Quinn, 1989**

# Spontaneous Quitters

- **Are less addicted**
- **Appear to be more concerned about effect of smoking on baby**
- **Have more years of school**

# **Smoking during Pregnancy *Possible Interventions***

- ***Clinical:***  
cessation counseling  
& pharmacotherapies
- ***Community-based:***  
mass media education
- ***Policy:***  
tobacco taxes

# **Smoking Cessation during Pregnancy**

## ***Message from the Field***

**“We are funded and very anxious  
to do a smoking cessation  
program for pregnant women,  
but we don’t know what to do.”**

**Healthy START Program    Syracuse, NY,  
October 1998**

# **Smoking Cessation during Pregnancy**

## ***Clinical Cessation Programs***

**Many different interventions have been used in an attempt to reduce or eliminate smoking in pregnancy:**

- **Physician Advice**
- **Self-help manuals and other printed materials**
- **Video-tapes**
- **Group clinics**
- **Psychotherapy**

# Smoking Cessation during Pregnancy

## *Clinical Cessation Programs*

- Many methods have not been tested rigorously in randomized trials.
- Most tested methods have not produced a significant increase in cessation.



# **Smoking Cessation during Pregnancy**

## ***Best Clinical Practice***

**Meta-analyses reviewing smoking  
cessation studies  
have concluded that:**

**For women smoking at the first prenatal  
visit, the provision of a single 5-15 minute  
counseling session by a trained provider  
plus appropriate print materials can  
increase cessation rates from 5-10% to  
15-20%.**

# **Smoking Cessation during Pregnancy**

## ***5-15 Minute Counseling Session***

- **Determine amount smoked**
- **Review smoking-associated risks to fetus, infant and mother**
- **Review benefits to cessation**
- **Teach methods to stop smoking**
- **Ask for commitment to stop smoking**
- **Ask for commitment to use self-help manual**

# **Smoking Cessation during Pregnancy**

## **5-15 Minute Counseling Session**

**The 5-15 minute counseling session appears to work equally well with women of various ethnic and racial groups.**

# **Smoking Cessation during Pregnancy**

## ***Cessation Programs***

- **In pregnancy, less intensive advice has not significantly increased cessation over background.**
- **In pregnancy, more intensive interventions have generally not increased cessation rates above those achieved using a 5-15 minute counseling session by a trained provider.**

# ***Smoking Cessation during Pregnancy Current Barriers***

**Other than advice to quit, most obstetric providers do not include smoking cessation counseling among their services because of counseling**

- **There are no specific ACOG recommendations**
- **Their staffs are untrained in this area**
- **There are too many intervention choices**
- **There is no reimbursement for counseling**

# **Smoking Cessation during Pregnancy**

## ***Print Materials***

**Print materials should be tailored for pregnancy and should present:**

- **Adverse effects of smoking on pregnancy**
- **Techniques to help quitting**
- **Benefits to be gained from quitting and for reducing smoking**

# **Smoking Cessation during Pregnancy**

## ***Provider Training***

- **A non-physician provider (nurse/nutritionist/social worker/etc.) can be trained and certified on site to screen and counsel using self-instructional educational/training materials.**
- **The total time needed for this training is less than 3 hours.**

# Implementing Cessation Programs

## ***Lessons Learned***

- **Execution matters**
- **Systems matter**
- **Incentives (to providers)  
work**

*The Guide to Community Preventive Services*



# Implementing Cessation Programs in MCOs

- **Develop administrative commitment**
- **Involve staff early in implementation planning**
- **Assign staff to monitor implementation**
- **Train clinical & support staff**
- **Adapt procedures to specific setting**
- **Evaluate and give feedback to staff**

Adapted from *Make Yours a Fresh Start  
Family*

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# Cessation Programs

## *Cost - Effectiveness*

**Using the 5-15 minute counseling session plus print materials, various investigators have estimated that there will be a \$3 reduction in medical costs for every \$1 spent on the intervention.**

# **Smoking Cessation during Pregnancy**

**The 5-15 minute counseling  
intervention has not  
significantly increased smoking  
cessation in heavy smokers.**

- **In non-pregnant smokers, both NRT (patch, gum, inhaler) and antidepressants (bupropion) approximately double cessation compared to behavioral methods.**
- **In very limited studies in pregnant women, NRT was not associated with adverse outcomes, but did have a short-term influence on fetal breathing movements and fetal heart rate variability.**

There are no existing studies in which the safety or efficacy of either antidepressants or NRT has occurred in a sufficiently large pregnant population to determine what might occur with large-scale use.

# **Smoking Cessation during Pregnancy**

## **Pharmacologic Interventions**

- **Since the heaviest smokers do not appear to respond well to behavioral interventions used alone, the use of adjunctive pharmacologic approaches to achieve cessation in these women should be explored.**
- **The efficacy and safety of these pharmacological approaches during pregnancy is unknown.**

# **Smoking Cessation during Pregnancy**

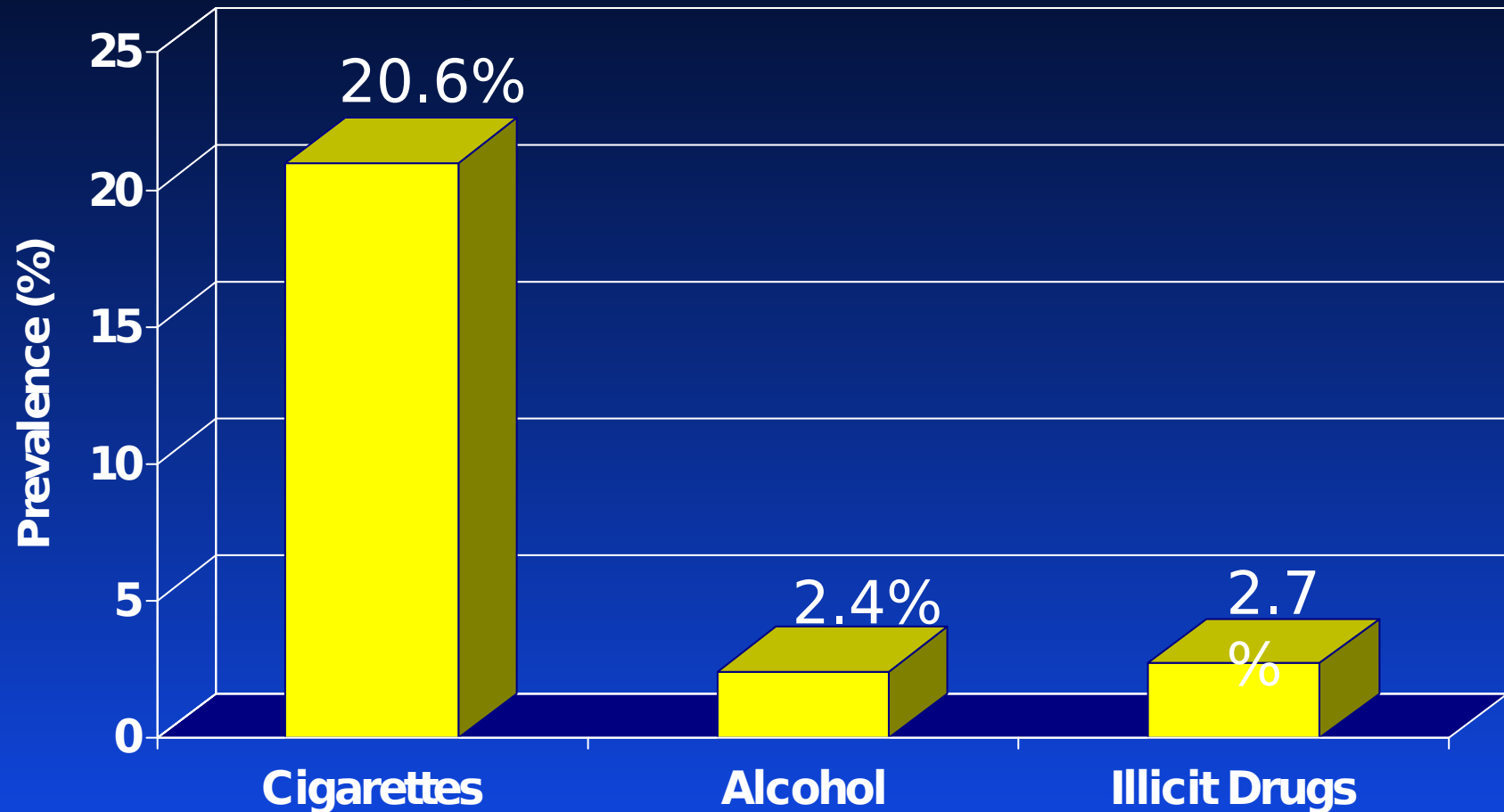
## ***Pharmacologic Methods***

- **Nicotine Replacement Therapy (NRT)**
- **Bupropion/Zyban**

# **Why Offer a Smoking Cessation Program during Pregnancy?**



# Substance Use in Past Month Among Women Aged 15-44 Years



*National Household Survey on Drug Abuse, 1994-*

**Smoke-Free Families** 1996

# **Smoking Cessation during Pregnancy**

**Stopping smoking is one of  
the few preventive  
measures likely to have a  
substantial impact on  
pregnancy outcome.**

# Smoking Cessation during Pregnancy

Pregnant smokers who **stop** smoking at any time up to the 30th week of gestation have infants with higher birthweight than women who smoke throughout pregnancy.

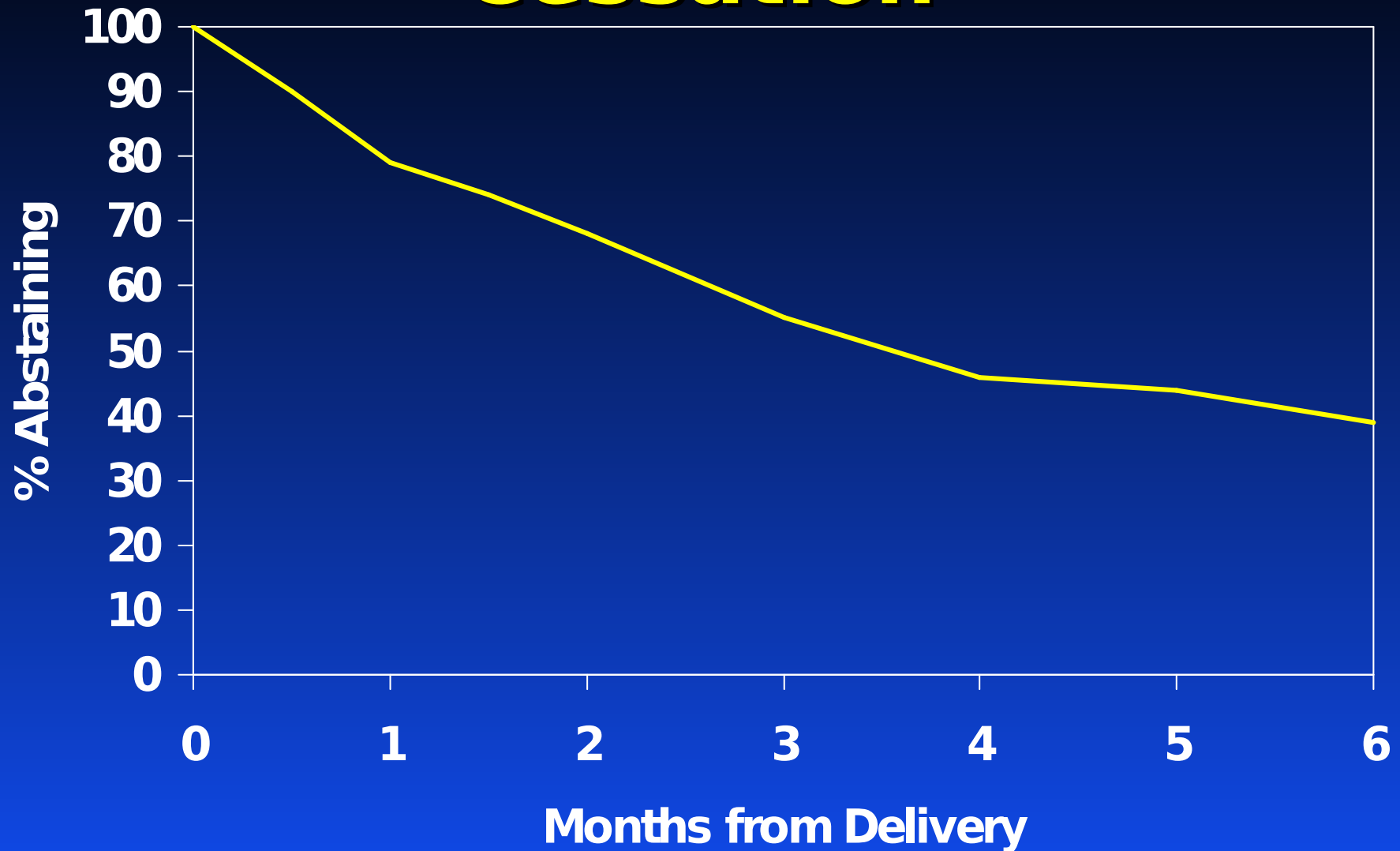
# Smoking Cessation during Pregnancy

***Reductions*** in cigarette smoking documented by a decrease in cotinine or other biologic markers, or by self-report, have been associated with an increase in birth weight.

# **Smoking Cessation during Pregnancy**

**Smoking cessation can  
also result in a  
permanent change in life-  
style that will reduce the  
risk of smoking-related  
chronic diseases.**

# Postpartum Smoking Cessation



Mullen, 1990

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# **Smoking Cessation during Pregnancy *Postpartum Maintenance***

**Up to 35% of women who stop  
smoking during pregnancy  
remain nonsmokers,  
benefiting  
• woman's health**

- Next pregnancy**
- Child's health**

# **Smoking Cessation during Pregnancy**

## ***Reduction of Medical Care Costs***

- **Direct health care costs**
  - prenatal
  - delivery
  - postnatal
- **Indirect costs**
  - years of life lost--infant mortality
  - lost productivity of mother



# **Smoking Cessation during Pregnancy**

## ***Reduction of Medical Care Costs***

- **The excess cost of neonatal care for the infant of a smoker averages \$500**
- **Prenatal smoking interventions may yield a benefit-cost ratio of 3:1 for the initial hospital stay and 6:1 using a longer time frame**
- **The break even point of prenatal smoking interventions is estimated to cost \$32-\$80**

# The Future

# Goal

**Achieve widest possible utilization by providers of an officially endorsed, pregnancy-specific, smoking cessation intervention**

# Next Step

**Develop a dissemination strategy to achieve maximum utilization of the intervention by:**

- **Private providers**
- **Public providers**
- **Managed care providers**

# **Smoking Cessation during Pregnancy**

## ***Dissemination Goal***

**Dissemination by the CDC and other federal agencies, ACOG, and the RWJF Tobacco Control initiatives has the potential to achieve a nationwide adoption of a single, pregnancy-specific, smoking cessation intervention to be delivered by all providers, thereby setting the standard of care for pregnant smokers.**